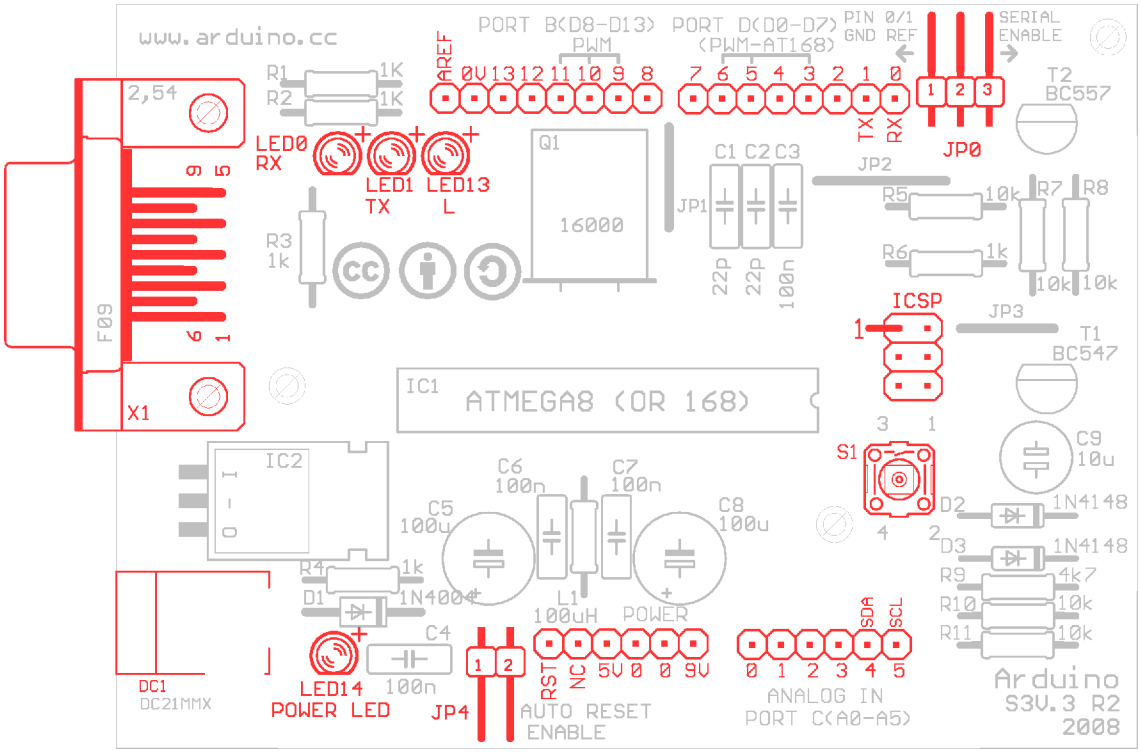
ARDUINO S3v3 - SERIAL SINGLE SIDED
VERSION 3 (REVISION 2)
USER MANUAL



X1:

DE-9 serial connector

Used to connect computer (or other devices) using RS-232 standard. Needs a serial cable, with at least 4 pins connected: 2, 3, 4 and 5. Works only when JP0 is set to 2-3 position.

DC1:

2.1 mm. power jack

Used to connect external power source. Centre positive.
Voltage Regulator Works with regulated +7 to +20 volts DC (9v. to 12v. is recommended).
It is possible to alternatively connect external power using 9v. pin or 5v. pin. (see POWER PINOUT)

ICSP:

2x3 pin header

Used to program Atmega with bootloader. The number 1 on both sides of the board indicates cable pin1 position.

JP0

3 pins jumper

When in position 2-3, this jumper enables serial connection (through X1 connector) to/from computer/devices. Use this as default position.

When in position 1-2, it disables serial communication, and enables external pull-down resistors on pin0 (RX) and pin1 (TX). Use this only to prevent noise on RX (that seems incoming data to Atmega), that sometimes makes sketch not starting.

When removing this jumper, serial communication is disabled, and pin0 and pin1 work as a normal (floating) digital pin. Useful when more digital pins are needed, but only when serial communication is not necessary. External pull-down/pull-up resistor is required.

JP4

2 pins jumper

When in position 1-2, this jumper enables auto reset feature, useful when uploading a sketch to Arduino, resetting Atmega automatically.
It makes unnecessary to press reset button (S1) when uploading sketches.
Be sure that computer COM Port speed is set to 19200bps otherwise auto reset will not work properly.

If removed, disables auto reset feature. Very useful to prevent undesired Atmega reset when using sketches that needs serial communication.
Auto reset works with DTR pulse on serial pin4. Sometimes Arduino senses a DTR pulse when connecting X1 (serial connector) and some softwares sends a DTR pulse when it starts or when it closes, that makes Atmega reset when not desired.

S1
Tactile button

This button resets Atmega, to restart uploaded sketch or to prepare Arduino to receive a sketch through serial connector (when auto reset is not active).

LEDS
Indicative leds

POWER led
Turns on when Arduino is powered through DC1, +9v. pin or +5v. pin.

RX led
Blinks when receiving data from computer/device through serial connection.

TX led
Blinks when sending data to computer/device through serial connection.

L led
This led is connected to digital pin13 with a current limiter resistor (that doesn't affect pin13). Useful to test sketches. It is normal to blink when bootloading too.

POWER PINOUT
6 pin header

RST pin
Makes Atmega reset when connected to GND. Useful for Shield Boards, or to connect external reset.

NC pin
This pin is not connected in Arduino S3v3. Arduino Diecimila has a 3.3 volts pin in the same position.

+9v. pin
When Arduino DC1 is powered (with battery or DC adaptor), this pin is used as Vout, with the same voltage supplied on DC1 (see DC1), minus 0,7 volts. The total supplied current depends on external power source capacity

When Arduino DC1 is not powered, +9v. pin can be used as Vin, connecting it to a external regulated power source (+7 to +20 volts) and connecting 0v. pin to external power source GND. In this case, +5v. pin can be used as Vout, supplying +5 volts.

+5v. pin
When Arduino DC1 is powered (with battery or DC adaptor), +5v. pin supplies +5 volts as a Vout pin. The total supplied current depends on Voltage Regulator (7805 supplies up to 1A). This applies only to +5v. pin: Atmega in/out pins only supplies max. 40mA on each pin.
When Arduino DC1 is not powered, this pin can be used as Vin, connecting it to a regulated +5v. and connecting 0v. pin to power source GND. In this case, +9v. pin is inactive.

0v. pin (GND)
Two 0v. pins between +5v. and +9v. / One 0v. pin beside AREF pin.
When Arduino DC1 is powered, 0v. pin supplies 0 volts reference (GND) for +5v. pin and +9v. pin.
When DC1 is not powered, and Arduino is powered through +5v. pin or +9v. pin, 0v. pin must be used as GND reference, connecting it to the external power source GND.

ANALOG IN PINOUT
6 pin header

6 analog inputs: 0 to 5, corresponding to Port C.
Pin4 (SDA) and pin5 (SCL) can be used with I2C (two-wire serial bus).

DIGITAL IN/OUT PINOUT

8 pin header (x2)

8 digital inputs/outputs: 0 to 7, corresponding to Port D.
Pin0 (RX) and pin1 (TX) can be used as communication pins.
Pin3, pin5 and pin6 can be used as PWM pins (Atmega168 only).

6 digital inputs/outputs: 8 to 13, corresponding to Port B.
Pin10 (SS), pin11 (MOSI), pin12 (MISO) and pin13 (SCK) can be used as SPI (Serial Peripheral Interface).
Pin9, pin10 and pin11 can be used as PWM pins (Atmega8 and Atmega168).

1 GND pin
see 0v. pin (GND).

AREF pin
The AREF can be set to AVcc (default), internal 2.56 volts (Atmega8), internal 1.1 volts (Atmega168), or external AREF.
In case of AVcc or internal AREF, AREF pin can be used to attach na external capacitor to decouple the signal, for better noise performance.

In case of external AREF, AREF pin is used to attach the external reference voltage.
Remember that it is necessary to change de fuses (wiring.c file), and re-upload sketch, before connecting external voltage to AREF.

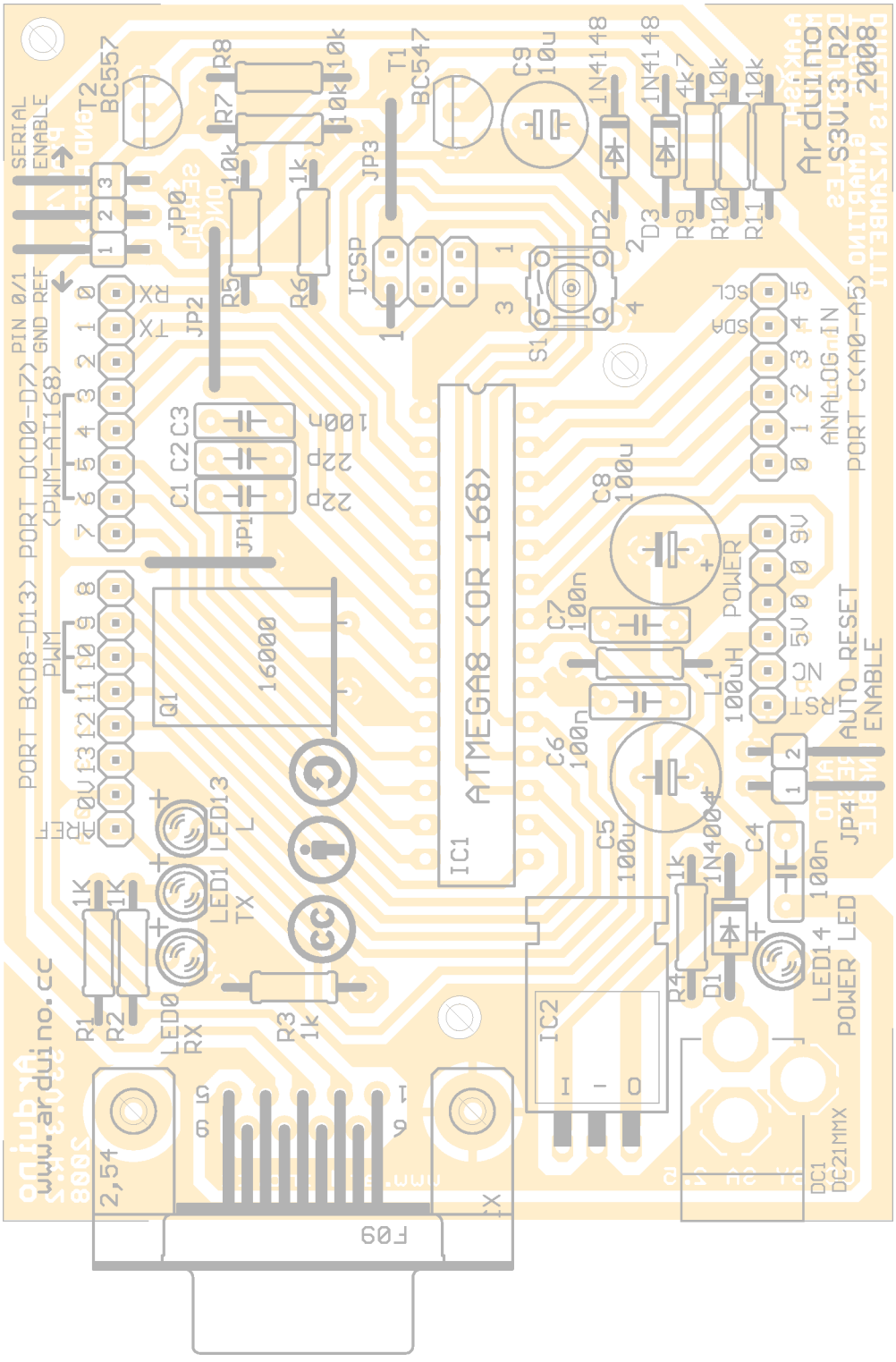
SOFTWARE TIPS

When bootloading na Atmega8 chip with Arduino 0010, there is a command (-i800) that makes bootloader delay 10 minutes. So, if you need to use bootloader, use command line instead of IDE, removing "–i800" command and adding "–F" command, or use Arduino 0007 IDE. To upload sketches Arduino 0010 works fine.

ARDUINO S3v3 NEW FEATURES

- full compatible with Shield Boards (Version 2 is the only Arduino Board not compatible with Shield Boards because of ICSP header wrong position, and tall components);
- AVcc LP filter to reduce noise level;
- auto reset feature;
- auto reset enable/disable jumper, to avoid not desired reseting;
- arduino Diecimila compatible reset pin;
- pin13 onboard led, with current limiter resistor;
- TX and RX onboard leds;
- power led with appropriate current limiter resistor (less 20mA of comsumption);
- jumper to disable serial communication and to enable RX external pull down resistor, to avoid “RX floating error”. This feature allows to use digital pin0 and pin1 as a normal pin, when serial communication is not needed;
- all similar components (diodes, transistors, leds, capacitors) has the same board orientation (to makes easier to mount with less mistakes);
- no wires between pads, more space between wires, larger wires, larger pads (better for etching, soldering and drilling, with no short circuits, soldering bridges or open wires in corrosion);
- only 3 wire bridges;
- electrolitic capacitor (in serial to TTL circuit) changed to bipolar type (to avoid inverted voltage problem when serial cable is not connected);
- All jumpers are right angle type, to allow Shield Boards use.

ARDUINO S3v3 - SERIAL SINGLE SIDED
VERSION 3 (REVISION 2)
MOUNTING MANUAL



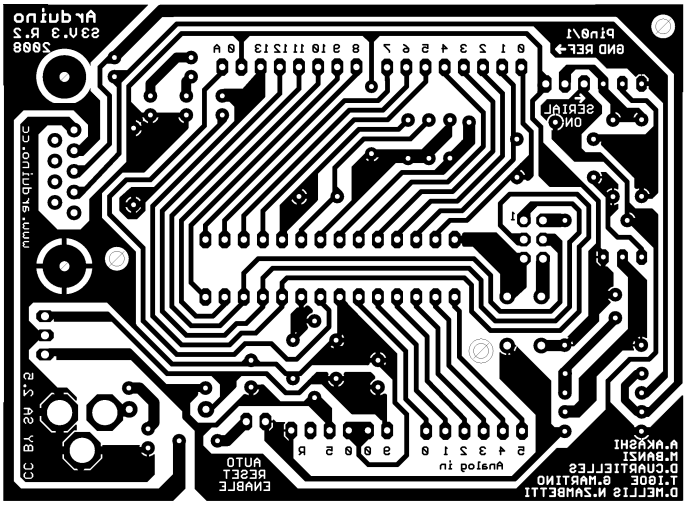
BILL OF MATERIAL

BILL OF MATERIAL FOR ARDUINO SERIAL SINGLE SIDED VERSION 3 (S3V3) - REVISION 2					
QTY	POSITION	DESCRIPTION	VALUE	DETAIL	
2	C1, C2	ceramic disc capacitor	22pF (22 pico Farad)		
4	C3, C4, C6, C7	tantalum capacitor	100nF (100 nano Farad - or 0.1 micro Farad)		
2	C5, C8	electrolytic capacitor	100µF (100 micro Farad)	16volts (or more: 25v)	radial-lead
1	C9	non-polarized electrolytic capacitor	10µF (10 micro Farad)	16volts (or more: 25v, 50v)	radial-lead
1	D1	diode	1N4004	DO41-10	
2	D2, D3	diode	1N4148	DO35-10	
1	DC1	2.1mm. DC power jack			
1	IC1	ATMEGA8 (or ATMEGA168)		28P3 package	
1	IC2	Tension Regulator	7805C		
1	ICSP	male pin header	2x3		
2	J1, J3	female pin header	1x8	0.1" (or 2.54 mm.)	
2	J2, POWER	female pin header	1x6	0.1" (or 2.54 mm.)	
1	JP0	right angle pin header	1x3	0.1" (or 2.54 mm.)	
1	JP4	right angle pin header	1x2	0.1" (or 2.54 mm.)	
1	L1	leaded inductor	100µH (100 micro Henry)	axial leaded	(silver)brown, black, brown, golden
4	LED0, LED1, LED13, LED14	LED	3 mm.	choose colors	
1	Q1	16 MHz crystal			
5	R1, R2, R3, R4, R6	Resistor	1kohm (1.0 kilo ohms)	1/4 Watt, ±5%	brown, black, red, gold
1	R9	Resistor	4k7ohms (4.7 kilo ohms)	1/4 Watt, ±5%	yellow, violet, red, gold
5	R5, R7, R8, R10, R11	Resistor	10kohms (10.0 kilo ohms)	1/4 Watt, ±5%	brown, black, orange, gold
1	S1	Switch Tactile	6x6 mm., 4 terminals		B3F-10XX
1	T1	Transistor	BC547	NPN general purpose transistor	TO92
1	T2	Transistor	BC557	PNP general purpose transistor	TO92
1	X1	D-SUB CONNECTOR	9 PIN FEMALE RIGHT ANGLE PC MOUNT	DE-9 CONNECTOR	
2	Jumpers	jumper for 0.1" header		0.1" (or 2.54 mm.)	

PART LIST

PART LIST FOR ARDUINO SERIAL SINGLE SIDED VERSION 3 (S3V3) - REVISION 2				
POSITION	VALUE	DESCRIPTION	DETAIL	
C1	22pF (22 pico Farad)	ceramic disc capacitor		
C2	22pF (22 pico Farad)	ceramic disc capacitor		
C3	100nF (100 nano Farad - or 0.1 micro Farad)	tantalum capacitor		
C4	100nF (100 nano Farad - or 0.1 micro Farad)	tantalum capacitor		
C5	100µF (100 micro Farad)	electrolytic capacitor	16volts (or more: 25v)	radial-lead
C6	100nF (100 nano Farad - or 0.1 micro Farad)	tantalum capacitor		
C7	100nF (100 nano Farad - or 0.1 micro Farad)	tantalum capacitor		radial-lead
C8	100µF (100 micro Farad)	electrolytic capacitor	16volts (or more: 25v)	radial-lead
C9	10µF (10 micro Farad)	non-polarized electrolytic capacitor	16volts (or more: 25v, 50v)	radial-lead
D1	1N4004	diode	DO41-10	
D2	1N4148	diode	DO35-10	
D3	1N4148	diode	DO35-10	
DC1		2.1mm. DC power jack		
IC1		ATMEGA8 (or ATMEGA168)	28P3 package	
IC2	7805C	Tension Regulator		
ICSP	2x3	male pin header		ICSP
J1	1x8	female pin header	0.1" (or 2.54 mm.)	PORT D(D0-D7)
J2	1x6	female pin header	0.1" (or 2.54 mm.)	PORT C(A0-A5)
J3	1x8	female pin header	0.1" (or 2.54 mm.)	PORT B(D8-D13)
JP0	1x3	right angle pin header	0.1" (or 2.54 mm.)	
JP4	1x2	right angle pin header	0.1" (or 2.54 mm.)	AUTO RESET
L1	100µH	leaded inductor	axial leaded	(silver)brown, black, brown, golden
LED0	3 mm.	LED	choose a color	Rx Led
LED1	3 mm.	LED	choose a color	Tx Led
LED13	3 mm.	LED	choose a color	Pin13 Led
LED14	3 mm.	LED	choose a color	Power Led
POWER	1x6	female pin header		
Q1		16 MHz crystal		
R1	1kohm (1.0 kilo ohm)	Resistor	1/4 Watt, ±5%	brown, black, red, gold
R2	1kohm (1.0 kilo ohm)	Resistor	1/4 Watt, ±5%	brown, black, red, gold
R3	1kohm (1.0 kilo ohm)	Resistor	1/4 Watt, ±5%	brown, black, red, gold
R4	1kohm (1.0 kilo ohm)	Resistor	1/4 Watt, ±5%	brown, black, red, gold
R5	10kohms (10.0 kilo ohms)	Resistor	1/4 Watt, ±5%	brown, black, orange, gold
R6	1kohm (1.0 kilo ohm)	Resistor	1/4 Watt, ±5%	brown, black, red, gold
R7	10kohms (10.0 kilo ohms)	Resistor	1/4 Watt, ±5%	brown, black, orange, gold
R8	10kohms (10.0 kilo ohms)	Resistor	1/4 Watt, ±5%	brown, black, orange, gold
R9	4k7ohms (4.7 kilo ohms)	Resistor	1/4 Watt, ±5%	yellow, violet, red, gold
R10	10kohms (10.0 kilo ohms)	Resistor	1/4 Watt, ±5%	brown, black, orange, gold
R11	10kohms (10.0 kilo ohms)	Resistor	1/4 Watt, ±5%	brown, black, orange, gold
S1	6x6 mm., 4 terminals	Switch Tactile		B3F-10XX
T1	BC547	Transistor	NPN general purpose transistor	TO92
T2	BC557	Transistor	PNP general purpose transistor	TO92
X1	9 PIN FEMALE RIGHT ANGLE PC MOUNT	D-SUB CONNECTOR	DE-9 CONNECTOR	
jumper		0.1" (or 2.54 mm.)		
jumper		0.1" (or 2.54 mm.)		

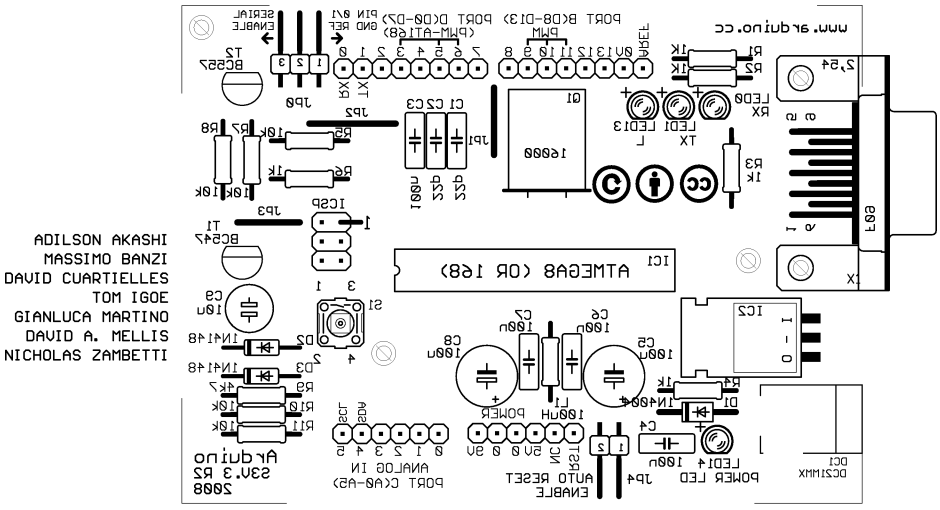
PCB – SOLDERING SIDE (Mirror Image)



ADILSON AKASHI
MASSIMO BANZI
DAVID CUARTIELLES
TOM IGOE
GIANLUCA MARTINO
DAVID A. MELLIS
NICHOLAS ZAMBETTI

Released under the Creative Commons Attribution Share-Alike 2.5 License
http://creativecommons.org/licenses/by-sa/2.5/

PCB – COMPONENT SIDE (Mirror Image)



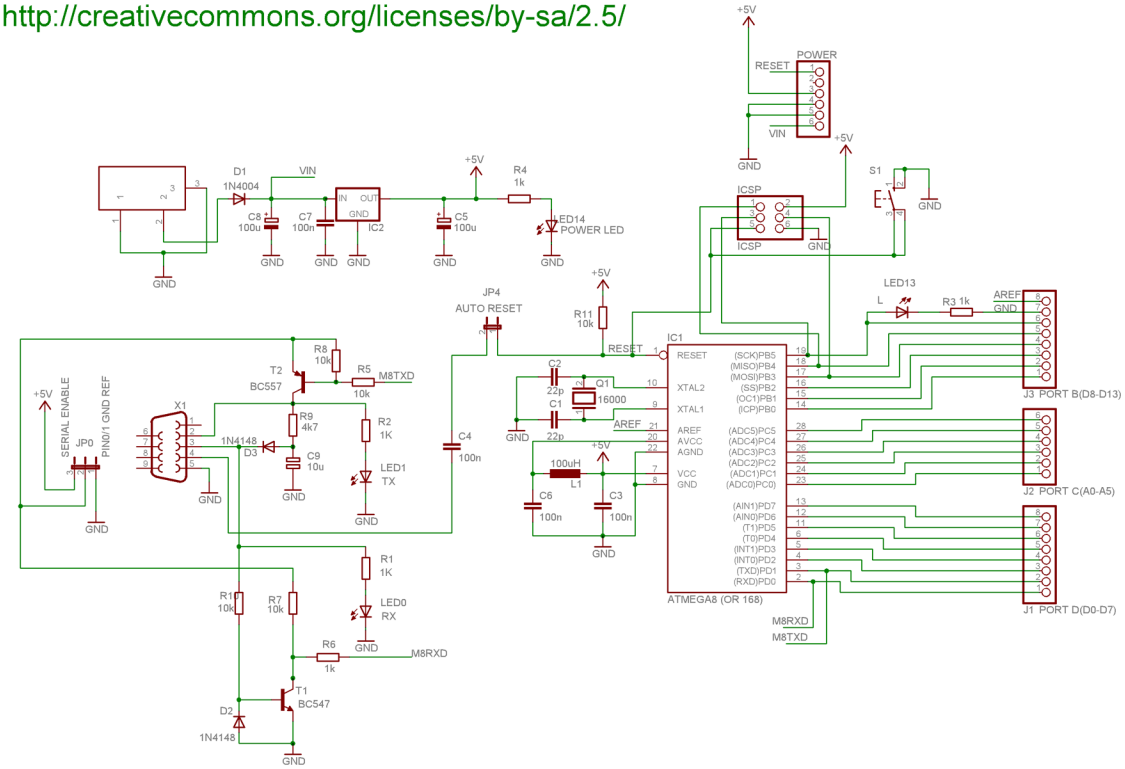
ADILSON AKASHI
MASSIMO BANZI
DAVID CUARTIELLES
TOM IGOE
GIANLUCA MARTINO
DAVID A. MELLIS
NICHOLAS ZAMBETTI

Released under the Creative Commons Attribution Share-Alike 2.5 License
http://creativecommons.org/licenses/by-sa/2.5/

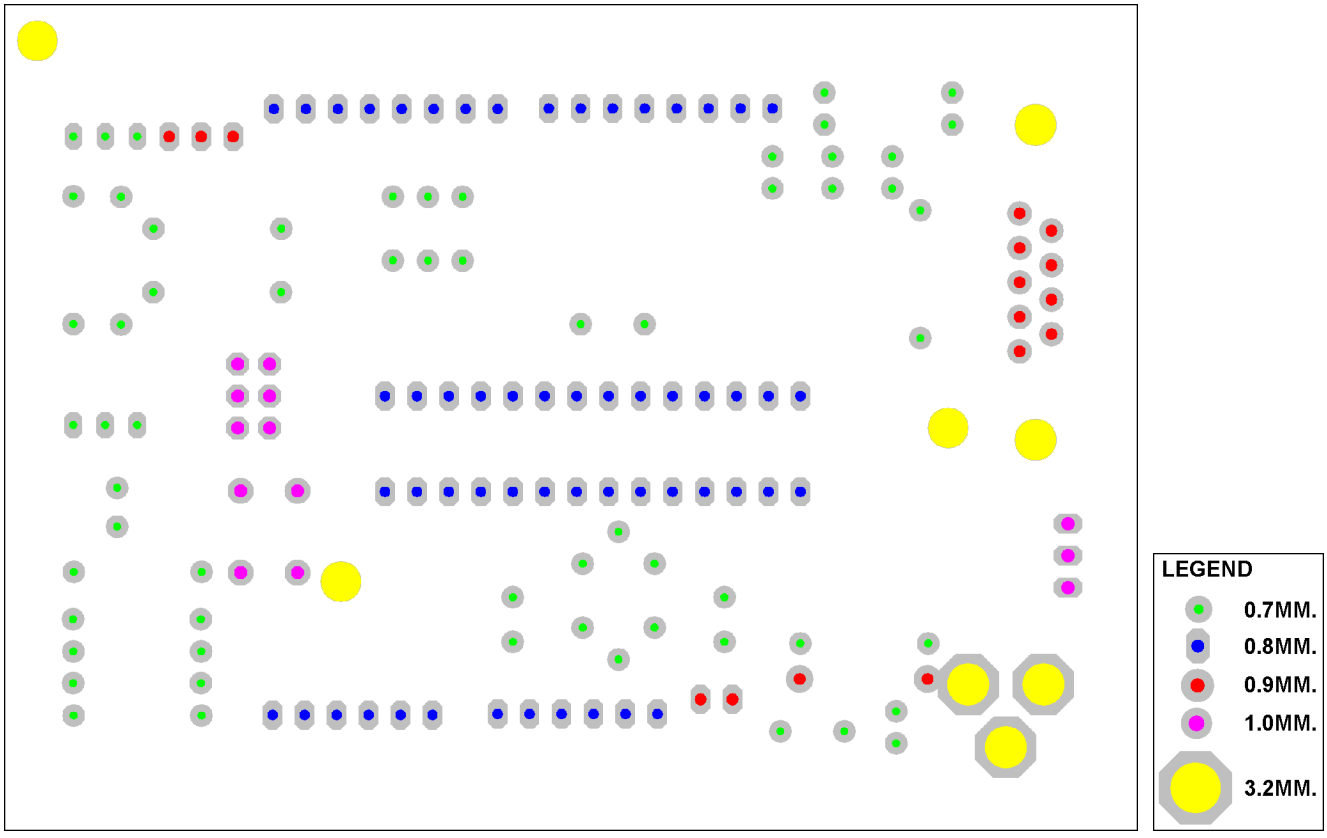
SCHEMATIC

Arduino S3v3 Revision 2

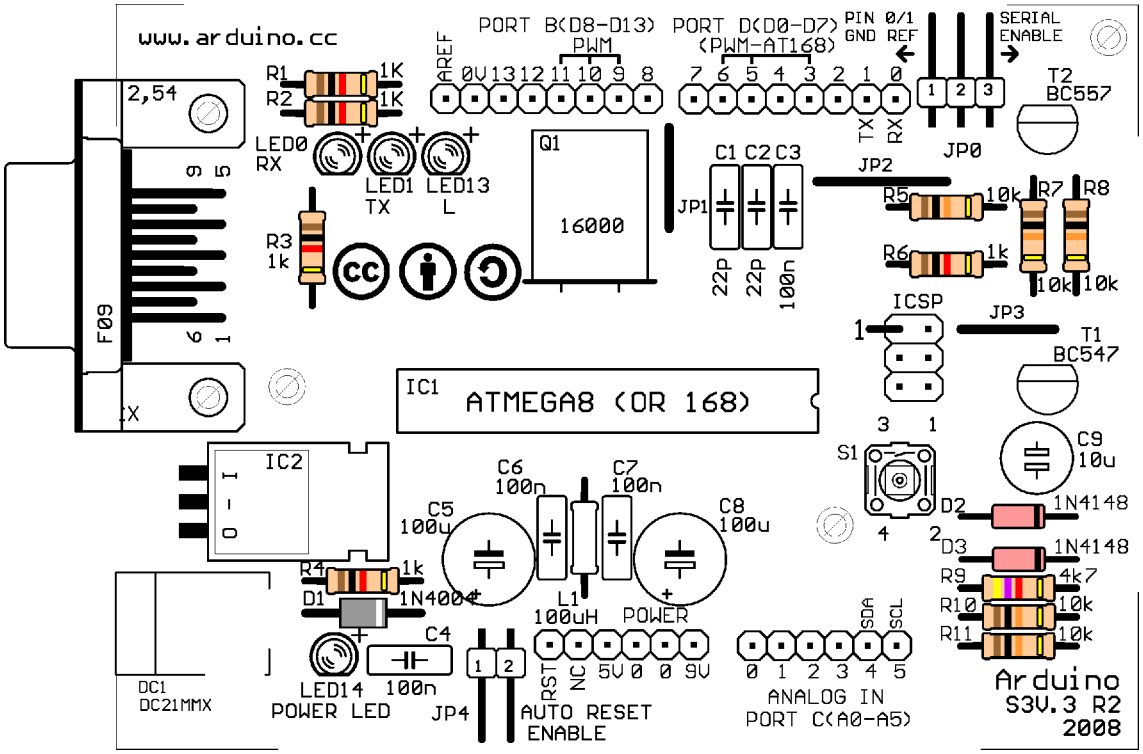
Released under the Creative Commons Attribution Share-Alike 2.5 License
http://creativecommons.org/licenses/by-sa/2.5/



DRILLING DIAGRAM (Soldering Side View)



MOUNTING DIAGRAM (Component Side View)



Mounting Tips

Pay attention to LED's lateral chamfer, electrolitical capacitor's negative (-) pole mark (mounting diagram has positive (+) mark), diode's stripe, Atmega IC's and IC socket's notch, and transistor's numbers and positions. Note that similar components have the same board orientation.